REMARKS

Claims 1-26 are pending in the present application. Claims 14-26 have been newly entered. Claims 1, 6, 7 and 13 are currently amended. No new matter has been entered as a result of the present amendments.

Claims 1-26 are in condition for allowance. Notice thereof is respectfully requested.

Specification

The abstract of the disclosure is objected to for failing to appear on a separate page. A subsitute page is included herein thereby rendering the objection moot.

The disclosure is objected to due to an informality. This is corrected by amendment.

Claim 1 is objected to for informalities. This is corrected by amendment.

All objections are corrected by amendment. Removal of the objections is proper and respectfully requested.

Claim Rejections - 35 USC § 112, second paragraph

Claim 1 is rejected under 35 U.S.C. 112, second paragraph due to insufficient antecedent support. Claim 1 has been amended to overcome the rejection.

Claims 5 and 6 are rejected for reciting the limitation 'and/or'. Applicant assumes that this was intended to be directed to claims 6 and 7. Claims 6 and 7 have been amended to overcome the rejection.

All rejections under 35 U.S.C. 112, have been overcome by amendment. Removal of the rejection is proper and respectfully requested.

Double Patenting Rejection

Claims 1-13 are provisionally rejected under the judicially created doctrine of double patenting over claims 1-14 of co-pending Application No. 10/050,667. The rejection is overcome by a terminal disclaimer filed herewith.

Claims 1-4, 6, and 8-10 are provisionally rejected under the judicially created doctrine of double patenting over claims 1-8 and 10-11 of co-pending Application No. 10/054,014. The rejection is overcome by a terminal disclaimer filed herewith.

Claim Rejections - 35 USC § 103(a)

Claims 1-13 re rejected under 35 U.S.C. 103(a) as being unpatentable over US PUB 2002/0110701 to Wehrmann et al. in view of US 6,379,583 to Gray et al.

Wehrmann is cited as disclosing a method for manufacturing a thin film inorganic light emitting diode. As indicated by the Office Wehrmann fails to disclose ZnS doped with a luminescent center by precipitation from appropriate aqueous solution comprising zinc ions, sulfide ions and dopant ions and washing dispersions of doped ZnS to remove non-precipitated ions.

Gray is incorrectly cited as teaching those elements lacking in the primary disclosure by Wehrmann. The technique of Gray is not a precipitation technique, as set forth in the claimed invention but is instead a two phase system wherein one phase is a bicontinuous cubic phase and the other phase is a solution. The formation of a doped ZnS occurs by some undescribed phenomenon involving the interior surface of the bicontinuous cubic phase and reactants which enter therein. The present invention is specific to an aqueous precipitation wherein all reactants are brought together to form a doped ZnS.

Col. 4 lines 1-7 of Gray are cited as forming a precipitation from an aqueous phase. This disclosure is taken out of context based on the teachings of the present invention. The disclosure of Gray describes a process wherein the reactants are maintained in an aqueous phase below a reaction temperature to prohibit precipitation until the bicontinuous cubic phase can be added into the solution. The reactants then diffuse into the interior of the bicontinuous cubic phase for reaction to occur. It is clear from the teachings of Gray that precipitation directly from aqueous solution is undesirable.

It is only in hindsight, based on the present application, that the teachings of Gray would be considered and then critical elements ignored to reach a finding of unpatentability. If the teachings of Gray are followed precipitation from aqueous solution is to be avoided. This is contrary to the present claimed invention.

In making the present rejection the Office has considered Wehrmann, which does not teach doped ZnS, combined with Gray, which teaches away from precipitation in aqueous solution. The present invention is directed to a doped ZnS, prepared by

precipitation directly from aqueous solution. This rejection can only be made in hindsight which is improper.

Furthermore, the preparation of the doped ZnS nanoparticles, according to Gray et al., requires a combination of surfactant and liquid hydrophilic phase at any ratio that produces a bicontinuous cubic phase, whereas in the method for manufacturing doped ZnS, according to the method of the present invention, no surfactant is required. This represents an unexpected simplification of the process according to Gray et al. neither indicated nor hinted at in Gray et al. Therefore, the process for preparing doped ZnS nanoparticles disclosed in present claim 1 differs from, and is inventive over, that disclosed in Gray et al. The doped ZnS prepared according to the present invention also differs from that prepared according to Gray et al. Evidence for this contention is provided by particle size measurements carried out on the doped ZnS nanoparticles prepared according to the present invention, as exemplified at page 18, lines 25-31 and at page 20, lines 31-33, of the present specification. The present specification further discloses orange electroluminescence for Mn-doped ZnS, prepared according to the present invention, and green

electroluminescence for Cu-doped ZnS, prepared according to the present invention. Gray et al. discloses Mn-doped ZnS nanoparticles with a photoluminescence emission peak of 590 nm (see figure 2) and copper-doped ZnS with green emission, but provides no evidence of their electroluminescent properties. Gray at col. 7, lines 12-15, merely discloses that:

> "Another unique advantage of the nanoparticles according to the present invention is that they are not only photoluminescent but can also be cathodoluminescent and electroluminescent."

This indicates that doped ZnS according to the preparation process disclosed in Gray et al. is not necessarily electroluminescent, whereas doped ZnS prepared according to the process, according to the present invention, exhibits electroluminescent properties.

We therefore contend that a combination of teachings of Wehrmann et al. and Gray et al. does not produce the method for manufacturing a Thin Film Inorganic Light Emitting Diode device of amended claim 1 and the claims dependent thereon. The cited references also do not teach, or obviate, the Thin Film Inorganic Light Emitting Diode device of amended claim 13, the

method for manufacturing a Thin Film Inorganic Light Emitting Diode device of new claim 14, the claims dependent thereon, or the Thin Film Inorganic Light Emitting Diode device of new claim 26. Claim 1 and the claims dependent thereon, amended claim 13, new claim 14 and the claims dependent thereon and new claim 26 cannot be adduced therefrom.

Furthermore, the electroluminescent element, according to the combination of the teaching of Wehrmann et al. and the teaching of Gray et al. contains at least a hole transport zone and an adjacent hole injection zone i.e. at least two zones. However, according to amended claim 1 and the claims dependent thereon and amended claim 13, the electroluminescent element, as defined in Wehrmann et al., can comprise a single layer containing the doped ZnS (n-type semiconductor) nanoparticles and a water-compatible p-type semiconductive polymer i.e. a zone with hole transport, hole injection and electron transport properties. We therefore contend that amended claim 1 and the claims dependent thereon and amended claim 14 cannot be adduced from a combination of Wehrmann et al. and Gray et al., which requires the presence of an electroluminescent element with at least a hole transport zone and an adjacent hole injection zone.

Moreover, according to new claim 14 and the claims dependent thereon and new claim 13, the electroluminescent element, as defined in Wehrmann et al., can comprise a layer containing the doped ZnS (n-type semiconductor) nanoparticles, i.e. a zone with electron transport properties, and a layer containing a water-compatible p-type semiconductive polymer i.e. a zone with hole transport and hole injection properties. We therefore contend that new claim 14 and the claims dependent thereon and new claim 26 cannot be adduced from a combination of Wehrmann et al. and Gray et al., which requires the presence of an electroluminescent element with at least a hole transport zone and an adjacent hole injection zone.

Claims 1 to 26 are patentable under 35 U.S.C. §103(a) over Wehrmann et al. in view of Gray et al. Notice thereof is respectfully solicited.

CONCLUSIONS

Claims 1-26 are pending in the present application. All claims are in condition for allowance. A notice of allowance for claims 1-26 is respectfully requested.

Respectfully submitted,

Joseph T. Guy, Ph.D.

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Agent for Applicants
Registration Number 35,172
NEXSEN PRUET JACOBS & POLLARD, LLC
P.O. Box 10648
Greenville, SC 29603
Telephone: 864-370-2211
Facsimile: 864-282-1177